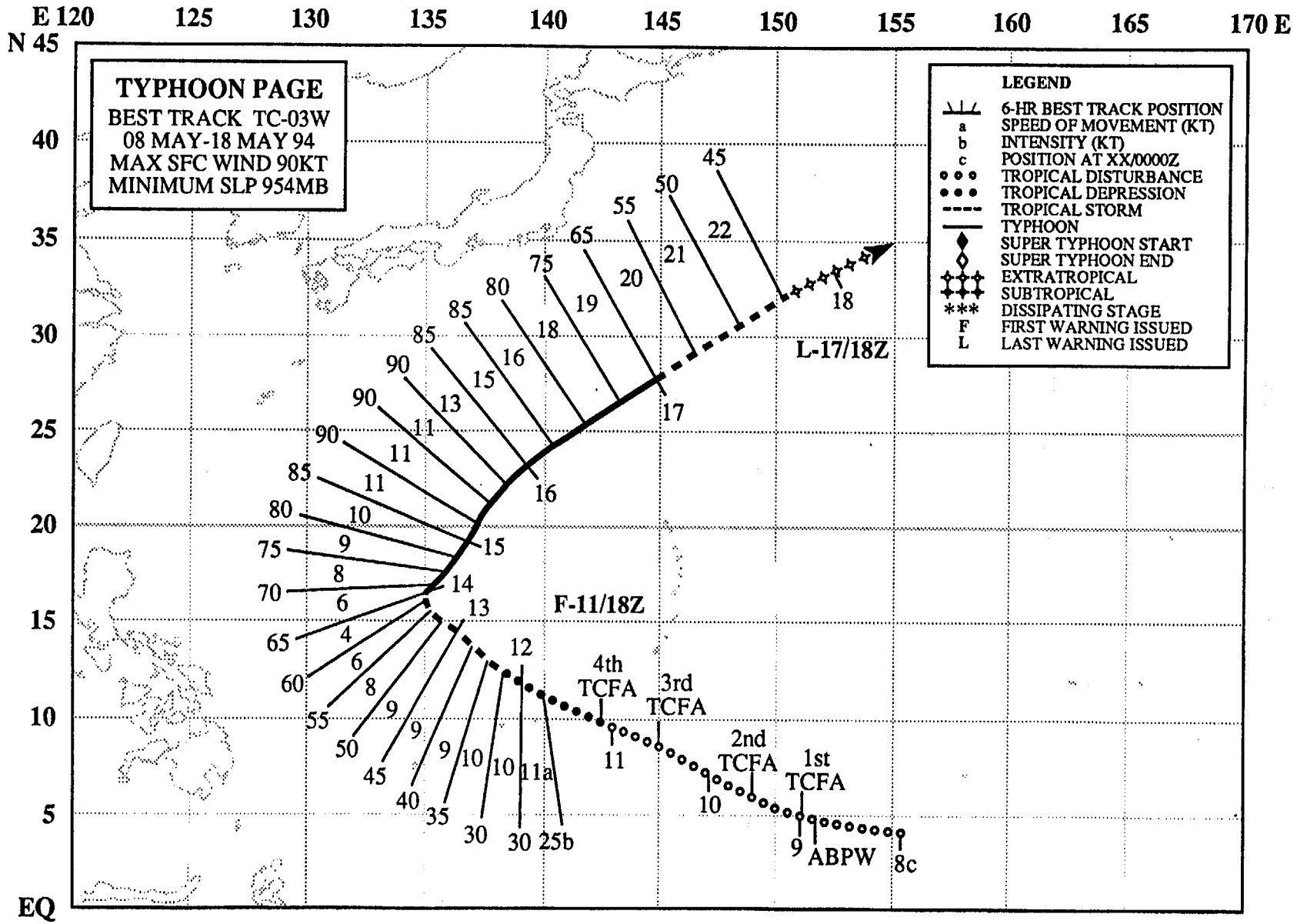
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EQ
TYPHOON PAGE
BEST TRACK TC-03W
08 MAY-18 MAY 94
MAX SFC WIND 90KT
MINIMUM SLP 954MB
LEGEND
6-HR BEST TRACK POSITION
a SPEED OF MOVEMENT (KT)
b INTENSITY (KT)
c POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
*** DISSIPATING STAGE
F FIRST WARNING ISSUED
L LAST WARNING ISSUED
L-17/18Z
F-11/18Z
4th TCFA
3rd TCFA
2nd TCFA
1st TCFA
ABPW
11a
25b
8c

TYPHOON PAGE (03W)

I. HIGHLIGHTS

Forming at very low latitude in the northern of twin near-equatorial troughs (i.e., one trough north of the equator, and the other south of the equator); Page was very slow to develop, with four Tropical Cyclone Formation Alerts issued prior to the first warning. Page was one of relatively few tropical cyclones that reach peak intensity well past the point of recurvature. The recurvature of Page was not well-anticipated, and the average 72-hour forecast error of 475 nm (880 km) was the largest for any western North Pacific typhoon during 1994.

II. TRACK AND INTENSITY

During the first week of May, there was extensive deep convection in Micronesia associated with a near-equatorial trough in the region. On 08 May, a flare-up of deep convection in the eastern Caroline Islands was included as a suspect area on the 081800Z May Significant Tropical Weather Advisory. By the morning of 09 May, visible satellite imagery indicated an increase in the organization of the deep convection in this tropical disturbance, and synoptic reports confirmed the presence of a low-level circulation center located near 5°N 153°E. The first of four Tropical Cyclone Formation Alerts was issued at 082355Z. A second Tropical Cyclone Formation Alert was issued at 091330Z because the estimated location of the low-level circulation center was nearing the edge of the previous alert box. The disturbance failed to intensify, but since conditions were deemed favorable for intensification, a third Tropical Cyclone Formation Alert was issued at 101330Z. By the evening of 11 May, a large convective band formed to the north of the estimated low-level circulation center, but the overall organization of deep convection within the system still did not indicate an increased intensity, so the fourth Tropical Cyclone Formation Alert was issued at 110530Z. During the early morning hours of 12 May, the organization of the deep convection improved rapidly, and the first warning was issued at 111800Z.

Page moved steadily on a northwestward track and slowly intensified during the 42 hours following the first warning. At 131200Z, the system abruptly slowed and began its turn toward the northeast, reaching its point of recurvature at 131800Z. Page became a typhoon at 140000Z. At 150000Z, thirty hours after the point of recurvature, Page's intensity peaked at 90 kt (46 m/sec) (Figure 3-03-1). After recurvature, Page gradually accelerated to a maximum forward speed of 22 kt (41 km/hr). The final warning was issued at 171800Z as Page began its transition to an extratropical low about 600 miles east-southeast of Tokyo.

III. DISCUSSION

a. Forecast performance

The average track forecast errors for Page were the worst for any typhoon during 1994. The main factor contributing to these large average errors was a failure to anticipate the recurvature of Page (Figure 3-03-2a). The NOGAPS model and its derived track guidance (Figure 3-03-2b) gave early indications of recurvature, but the repetition of numerical forecasts of northward motion during a period of ongoing westward motion eroded the forecasters confidence in the numerical guidance. As a result, JTWC forecasters relied more on a consensus of various climatological, statistical and dynamic aids, which correctly indicated a decrease in the forward speed of motion, but were late to forecast recurvature.

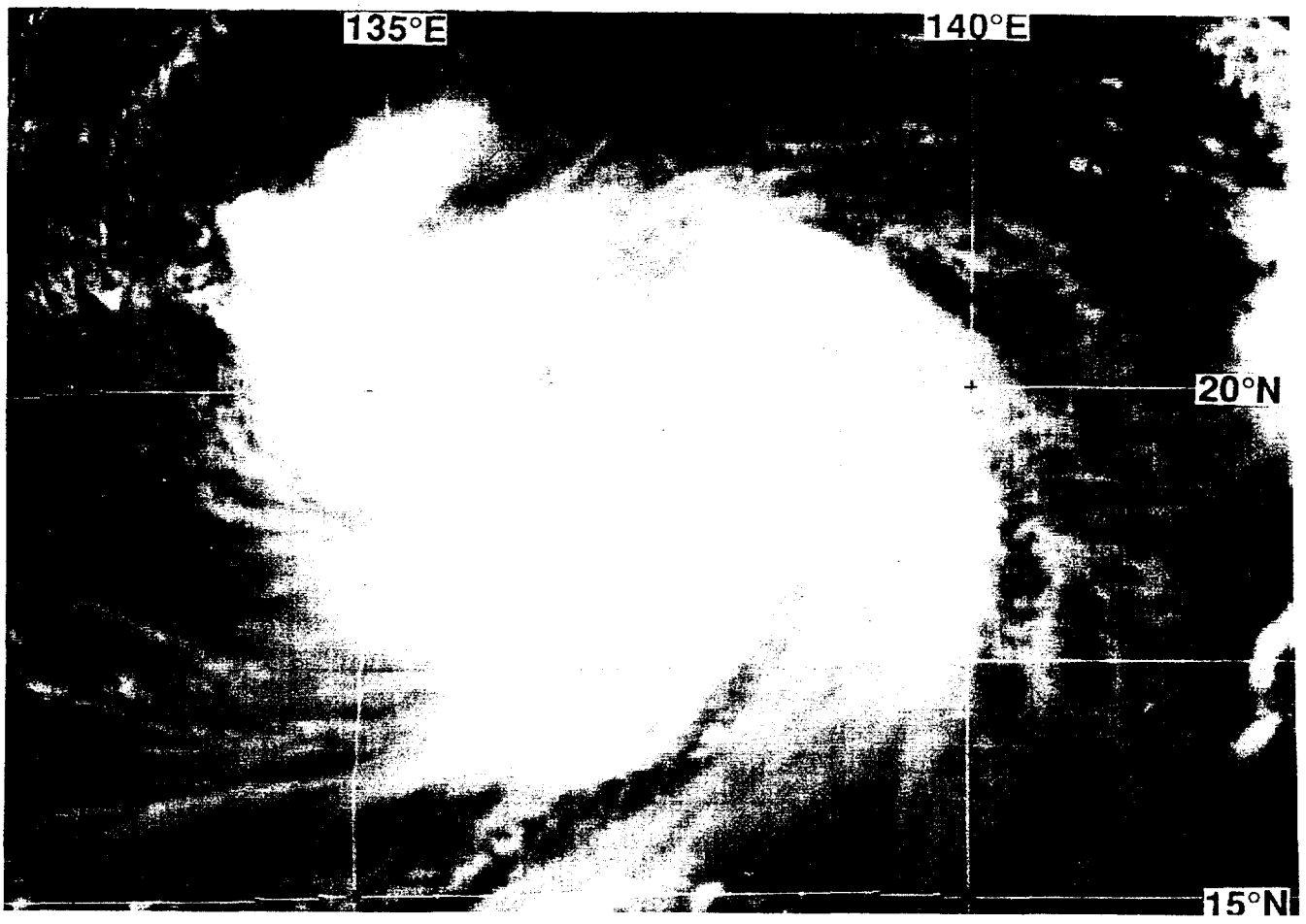
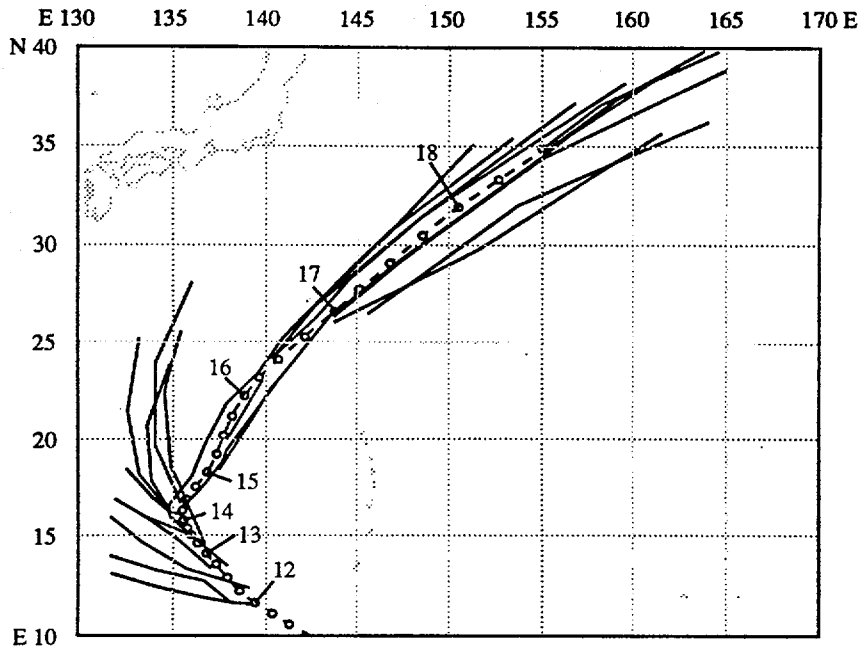


Figure 3-03-1 Page at peak intensity (150231Z May visible GMS imagery).

b. Peak intensity after recurvature

Of 77 cases of typhoons that exhibited classical recurvature (i.e., a roughly "<"-shaped track that features initial steady west-northwestward motion, then a northward turn while slowing, followed by an acceleration toward the northeast) during the period 1978 to 1993, about three-fourths (57) reached peak intensity at, or before, the point of recurvature (Figure 3-03-3); where the point of recurvature is identified as that point where the typhoon reaches its western-most longitude as it moves poleward. A much smaller group (seven) reached peak intensity 24 hours or more after the point of recurvature. Page reached its peak intensity of 90 kt (46 m/sec) 30 hours after the point of recurvature placing it in the very small group of typhoons that have waited that long. Another interesting feature of Figure 3-03-3, is an apparent relationship (represented by the best-fit curve) between typhoon peak intensity and its timing with respect to the point of recurvature. The higher the peak intensity of a recurving typhoon, the greater the delay of recurvature with respect to the timing of the peak intensity. Of the 30 recurving typhoons reaching peak intensities of 120 kt (62 m/sec) or greater during the period 1978 to 1993, only three reached peak intensity after recurvature. On average, recurving typhoons attaining peak intensities less than 120 kt (62 m/sec) reached peak intensity about 12 hours prior to the point of recurvature; recurving typhoons attaining peak intensities of 120 kt (62 m/sec) or greater reached peak intensity about 48 hours prior to the point of recurvature.

(a)



(b)

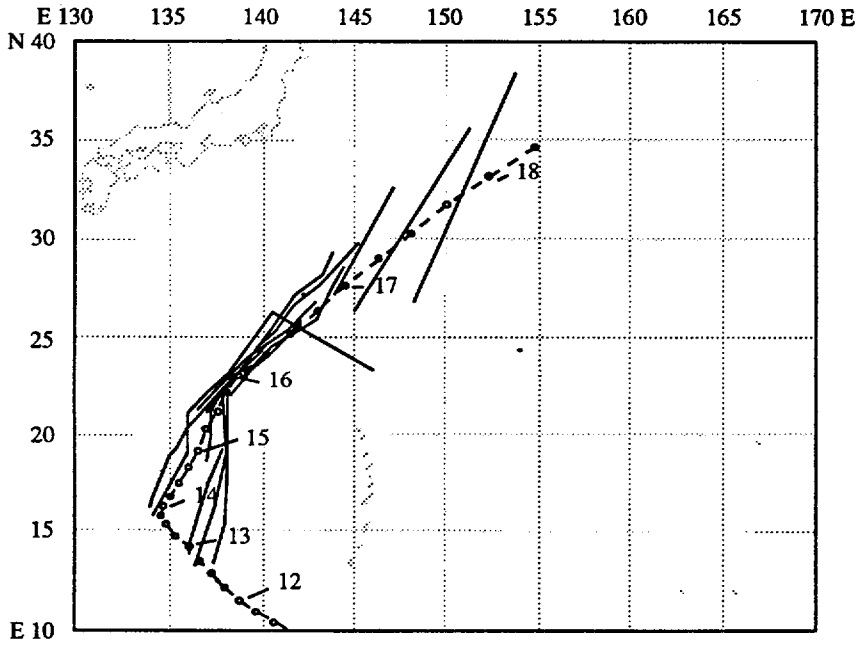


Figure 3-03-2 (a) JTWC forecast tracks prior to the point of recurvature of Page. (b) NOGAPS forecast tracks prior to the point of recurvature of Page.

IV. IMPACT

Typhoon Page remained over open ocean its entire life, and no reports of fatalities or significant damage were received. Large westerly swell generated by Page while it was in the Philippine Sea impacted the western shores of the Mariana Islands. Several tourists required rescue from high surf and strong currents along Guam's western reefs.

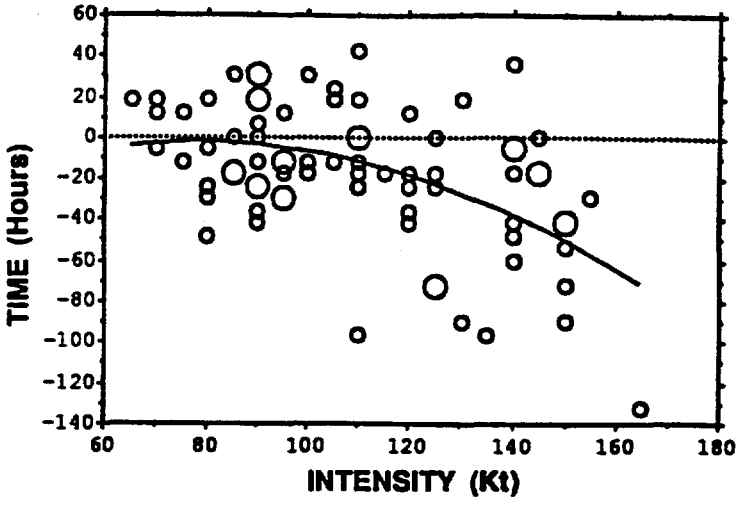


Figure 3-03-3 Timing of peak intensity (kt) with respect to the time of recurvature (+/- hours) versus peak intensity for 77 recurving typhoons during the period 1978 to 1993. Open circles indicate individual typhoons, larger open circles indicate more than one typhoon occupies that point on the graph. A circle on the dashed zero line is indicative of a typhoon that reached peak intensity at the same time that it reached its point of recurvature; typhoons reaching peak intensity after recurvature are plotted above this line, those reaching peak intensity prior to recurvature are plotted below. The best-fit second-order polynomial is indicated by the curve defined by: $Y = -58.315 + 1.453 X - .009 X2$. If the peak intensity, X, is known, this equation estimates the number of hours, Y, between the time of peak intensity and the time when the typhoon reaches its point of recurvature.